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A NEW LIQUID OXYGEN CRYOSTAT

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Although the gas flow type cryostats, using liquid oxygen as coolant, constructed by Bose (1947) and by Dutta Roy (1955) are quite simple and efficient, the range of temperature covered with these is about 300°K to 85°K (Bose 1947). The control of the temperatures is not very fine and the measurements at small intervals of temperature cannot be conveniently undertaken. The system is not also economic as much of the cold is wasted.

In view of the above difficulties the present authors have constructed a new liquid oxygen bath type cryostat which provides an extremely fine control of temperature and makes it possible to work between 400°K and 64°K. The cryostat consists of a wide-mouthed silvered glass Dewar vessel carrying the liquid oxygen, with a narrow tail to be accomodated between the pole pieces of an electromagnet. The experimental chamber is a silvered vacuum jacketted pyrex glass tube passing down into the tail. The temperature inside the experimental chamber is accurately maintained by controlling the pressure inside the vacuum jacket and balancing the cold from liquid oxygen with the heat from a small non-inductive electric heater within the chamber. The control is, further, made automatic with the help of a gas-thermometric relay system. The Dewar is connected to a low vacuum pump to boil the contained liquid oxygen at different reduced pressures to obtain temperatures down to 64°K.

It has been observed that the temperature remains very accurately constant for a long time within 0.05°C. These are measured with a calibrated Cu-constantan thermocouple.

Details of the cryostat will be published shortly.

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REFERENCES

Bose, A., 1947, *Ind. Jour. Phys.*, **21**, 277.

Dutta Roy, S. K., 1955, *Ind. Jour., Phys.*, **29**, 429.